



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/630,613	07/30/2003	Ming Zheng	CL2191US NA	3957

23906 7590 05/11/2007
E I DU PONT DE NEMOURS AND COMPANY
LEGAL PATENT RECORDS CENTER
BARLEY MILL PLAZA 25/1128
4417 LANCASTER PIKE
WILMINGTON, DE 19805

EXAMINER

FORMAN, BETTY J

ART UNIT	PAPER NUMBER
----------	--------------

1634

MAIL DATE	DELIVERY MODE
-----------	---------------

05/11/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/630,613

Applicant(s)

ZHENG ET AL.

Examiner

BJ Forman

Art Unit

1634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 1-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 20-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 1634

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6 March 2007 has been entered.

Status of the Claims

2. This action is in response to papers filed 6 March 2007 in which claims 20, 25, 26, 30 were amended. The amendments have been thoroughly reviewed and entered.

The previous objection to Claim 20 is withdrawn in view of the amendments. The previous rejections under 35 U.S.C. 102 (b) and (e) over Mirkin and Barbera-Guillemant are withdrawn in view of the amendments which define the complex as having a "single ligand". The previous rejections under 35 U.S.C. 102(a/b) over Niemeyer et al are maintained. Applicant's arguments have been thoroughly reviewed and are discussed below as they apply to the instant grounds for rejection. New grounds for rejection are discussed.

Claims 1-19 are withdrawn.

Claims 20-31 are under prosecution.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Art Unit: 1634

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 20-21, 23-31 are rejected under 35 U.S.C. 102(a)/(b) as being anticipated by Niemeyer et al (Chembiochem, 2001, 260-264).

This reference was supplied by Applicant in the IDS of November 2003. The only date provided on the IDS was the year i.e. 2001. Depending on the month of publication, the reference is either a 102 (a) or 102(b) reference. Because the month of publication is not known by the Office, the reference is rejected under both 102 (a) and 102(b).

Regarding Claim 20, Niemeyer et al disclose a geometric nanostructure comprising at least three complexes spatially arranged in an ordered geometric pattern (Fig. 1, 4 and 5), the complexes comprising a nanoparticle (Abstract) and a single ligand (DNA:STV is 3:2, providing at least some STV with a single copy of a single ligand, page 263, right column, first full paragraph), wherein the ligand has a proximal portion attached to the nanoparticle and a distal portion wherein the complexes are each affixed to each other through the distal portion (Fig. 1, 4-5 and accompanying text).

Regarding Claim 21, Niemeyer et al disclose the nanoparticle having a diameter of 2 to 10 nm (page 261, right column, first full paragraph).

Regarding Claim 23, Niemeyer et al disclose the nanostructure wherein the ligand is a protein, nucleic acid, peptide nucleic acid or oligomer (Fig. 1,4-5).

Regarding Claim 24, Niemeyer et al disclose the nanostructure wherein the ligand is nucleic acid or peptide nucleic acid (Fig. 1, 4-5).

Regarding Claim 25, Niemeyer et al disclose the nanostructure wherein the ligand is derivatized to include a functional group at the distal end (page 263, right column, first full paragraph).

Art Unit: 1634

Regarding Claim 26, Niemeyer et al disclose the nanostructure wherein the functional group is a NH₂ with 1-12 carbon, thiol groups with 1-12 carbon, biotin group with 1-12 carbon i.e. the free ends are capped using one of many functional groups (page 263, right column, first full paragraph).

Regarding Claim 27, Niemeyer et al disclose the nanostructure wherein the ligand is a nucleic acid and the complexes are affixed by hybridization of distal portions of the nucleic acid (as illustrated in Fig. 1, 4-5).

Regarding Claims 28-29, Niemeyer et al disclose the nanostructure of Claim 20 wherein the ligand (nucleic acid) has a functional group that is a first member of a binding pair (e.g. biotin) and wherein the complexes are affixed to a second member of the binding pair (page 263, right column, first full paragraph).

Regarding Claim 30, Niemeyer et al disclose a geometric nanostructure comprising at least two complexes spatially arranged in an ordered geometric pattern (Fig. 1, 4 and 5), the complexes comprising a nanoparticle (Abstract) and a single ligand (DNA:STV is 3:2, providing at least some STV with a single copy of a single ligand, page 263, right column, first full paragraph), wherein the ligand has a proximal portion attached to the nanoparticle and a distal portion wherein the complexes are each affixed to each other through the distal portion (Fig. 1, 4-5 and accompanying text).

Regarding Claim 31, Niemeyer et al disclose the nanoparticle having a diameter of 2 to 10 nm (page 261, right column, first full paragraph).

Response to Arguments

Applicant asserts that the nanoparticle of Niemeyer is a streptavidin particle, which is a protein, not a metal. Applicant further asserts that the instantly claimed nanoparticles are necessarily metal and therefore Niemeyer cannot anticipate the instant invention. The argument has been considered but is not found persuasive because the claims are not limited to metal nanoparticles. While the instant specification (page 4, lines 34-36) defines a

Art Unit: 1634

nanoparticle as metallic, the specification (page 8, lines 23-25) and dependent Claim 22 define the nanoparticle as comprising metals or semiconductors. Claim 22 further defines the nanoparticle of Claim 20. If the nanoparticle of Claim 20 is limited to metal as asserted, then Claim 22 does not further limit Claim 20. Because the specification provides differing definitions of the nanoparticle, the specification cannot be relied upon to limit the composition of the nanoparticle. Furthermore, the limitations of Claim 22 suggest that Application does not intend to limit the nanoparticle to metal. For these reasons, the above rejection is maintained.

Applicant asserts that the complexes of Niemeyer show two-three bindings and not the single binding as claimed. The assertion is noted, however, the reference clearly illustrates one-to-one binding between particle and ligand (Fig. 4-5). The presence of additional complexes does not alter the fact that the reference provided the complexes as claimed.

Applicant further asserts that Niemeyer does not demonstrate control of nanostructure assembly as provided in the instant invention. The assertion is noted, but is not found persuasive because even if the claim defined a process for making the nanostructure, the process of making a product, does not define a product made by another method (see MPEP § 2173.05(p)I).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1634

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Niemeyer et al (Chembiochem, 2001, 260-264) in view of Mirkin et al (U.S. Patent No. 6,361,944, filed 25 June 1999).

Regarding Claim 22, Niemeyer et al disclose a geometric nanostructure comprising at least three complexes spatially arranged in an ordered geometric pattern (Fig. 1, 4 and 5), the complexes comprising a nanoparticle (Abstract) and a single ligand (DNA:STV is 3:2, providing at least some STV with a single copy of a single ligand, page 263, right column, first full paragraph), wherein the ligand has a proximal portion attached to the nanoparticle and a distal portion wherein the complexes are each affixed to each other through the distal portion (Fig. 1, 4-5 and accompanying text).

Niemeyer et al disclose the nanoparticle is comprised of streptavidin (STV) which they illustrate as responding to ionic switching as illustrated in Fig. 4, page 262. This clearly suggests the STV has semiconductive properties but they do not specifically teach metal or semiconductor particles. However, Mirkin et al teach a similar nanoparticle-DNA complex wherein the nanoparticle is metal/semiconductor and especially preferred for the electronic and luminescent properties (Column 17, lines 12-14). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the gold nanoparticles of Mirkin et al to the complex of Niemeyer et al. One of ordinary skill in the art would have been motivated to do so with a reasonable expectation of success and for the expected benefit of providing the electronic and luminescent properties as preferred in the art (Mirkin, Column 17, lines 12-14).

Conclusion

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BJ Forman whose telephone number is (571) 272-0741. The examiner can normally be reached on 6:00 TO 3:30.

Art Unit: 1634

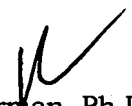
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ram Shukla can be reached on (571) 272-0735. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to (571) 272-0547.

Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is (866) 217-9197. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the specific nature of the problem. The Patent Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also check PAIR to confirm that the problem has been corrected. The USPTO's Patent Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public.

For all other customer support, please call the USPTO Call Center (UCC) at 800-786-9199.



BJ Forman, Ph.D.
Primary Examiner
Art Unit: 1634
May 4, 2007